A place in the shade: reducing the risks of UV exposure

The content of this article reflects the conclusions of the Second Symposium on Ultraviolet Radiation–related Diseases, held in Vancouver in May 1996. Symposium participants reviewed the evidence of the relation between ultraviolet radiation (UVR) and disease, discussed strategies to reduce the burden of illness attributable to UVR and identified further directions for scientific research. A full report is published in Chronic Diseases in Canada [1997;18(1)].

Ultraviolet radiation (UVR) comes from the sun and from nonsolar sources such as fluorescent lighting and tanning devices. The wavelength of UVR determines its degree of absorption by stratospheric ozone and its ability to penetrate tissue. The ozone layer absorbs UVC (wavelength < 280 nm) and some UVB (280–320 nm) but not UVA radiation (> 320 nm).

There is increasing evidence of a causal relation between UVR and cancer, including cutaneous malignant melanoma (CMM), basal-cell carcinoma, and squamous-cell carcinoma of the skin and lip; this evidence is more convincing for UVB than for UVA radiation. Increased ground levels of UVB radiation appear to be related to the thinning of the ozone layer. However, given the time-lag in disease development, the rising incidence of skin cancer is probably related more to increased exposure to sources of UVR than to ozone depletion.

Epidemiology

It is estimated that more than 61 000 Canadians will be diagnosed with nonmelanoma skin cancer this year. In addition, 3200 people will be diagnosed with CMM, of whom 660 will die of the disease. Incidence rates for CMM between 1971 and 1996 more than doubled, from 3.4 to 11.2 per 100 000 men and from 4.0 to 8.8 per 100 000 women. In the same period, the rate of death from CMM increased from 1.4 to 2.7 per 100 000 men and from 1.0 to 1.4 per 100 000 women. (Rates for 1996 are estimates.) The Canadian Dermatology Association (CDA) estimates that a child born in Canada today has a 1 in 115 lifetime risk of CMM and a 1 in 7 lifetime risk of the more common forms of skin cancer.

Chronic exposure to UVR is also associated with cortical and posterior subcapsular cataract, photodermatoses, and photoaging of the skin and eye. The skin’s immune function is depressed by exposure to UVR, but whether this has a clinically significant effect on susceptibility to infectious agents or cancer is unclear.

Risk factors

Skin cancer risk is related to skin type and degree of exposure to UVR. People with any of the following characteristics are at increased risk: fair skin; blond or red hair; light-coloured eyes; tendency to burn before tanning; tendency to freckle; many moles; 2 or more severe sunburns before age 18; family history of skin cancer; and outdoor occupation. CMM and basal-cell carcinoma are more likely related to intermittent exposure, and exposure during childhood, than to long-term continuous exposure. A recent case–control study has quantified the association between the number, size and type of moles and increased risk for CMM. In children, the presence of many moles may indicate excessive early exposure and should prompt physicians to remind parents about the importance of sun protection. A tan indicates UVR damage to the skin and, contrary to popular belief, gives very little protection from further damage. The use of tanning devices is also not protective and may in fact increase the risk of skin cancer and other UVR-related diseases.

Risk reduction

The challenge for the coming decades will be to reduce the risks of UVR exposure without sacrificing the benefits of outdoor activity. Behavioural changes are key. Patients should be counselled to avoid the sun during peak hours (11 am to 4 pm), to seek shade, to apply broad-spectrum sunscreen and lip balm with a sun protection factor (SPF) of 15 or higher, to wear UVR-blocking sunglasses, to shield as much skin as possible with closely woven garments and to wear broad-brimmed hats. Fog, haze and light cloud offer little protection against UVR, and temperature is not indicative of UVR levels. People who enjoy winter sports should bear in mind that fresh snow reflects up to 85% of UVR.

The CDA recommends the use of sun protection products rated SPF 15 or higher that bear the association logo and endorsement. As described in their public education materials, SPF relates to the amount of time that it would take to get a sunburn while wearing the sunscreen compared to the amount of time it would take without protection. Theoretically, an SPF 15 sunscreen would allow a person to spend 15 times longer than usual in the sun without getting a sunburn. However, sunscreens are...
intended to increase protection during unavoidable exposure, not to maximize exposure times. Although they prevent sunburn, they do not prevent other UVR damage to the skin. Protection does not increase proportionately with the SPF number: a sunscreen rated SPF 30 blocks only about 3% more UVB than those rated SPF 15. Product labelling can be misleading in this regard; for example, a manufacturer may claim that a product that blocks all but 3% of UVR offers twice the protection of a product that blocks all but 6% (Dr. John Adam, Chair, CDA Sunscreen Product Education Committee: personal communication, 1997). Moreover, SPF relates to protection against UVB radiation only; there are no accepted standards to measure UVA protection in sunscreens. Nevertheless, “broad-spectrum” sunscreens, which give some protection against both wavelengths, are recommended.

Because many people do not apply sunscreens as often or as heavily as necessary, the effectiveness of these products can fall far short of the efficacy demonstrated in research settings. Sunscreens should be applied liberally 15 to 30 minutes before exposure; most brands should be reapplied every 2 hours. Infants should be kept out of the sun, but when sun protection is necessary, physical rather than chemical barriers are preferred. Physicians should try to convey the message that sunscreens are only 1 component of effective sun protection.

Participants at the Second Symposium on Ultraviolet Radiation-related Diseases concluded that screening for CMM is not currently recommended, and that the promotion of skin self-examination remains controversial. Self-reporting and case-finding of potentially malignant lesions is central to reducing skin cancer mortality. A comprehensive risk-reduction strategy would include: public health messages (especially for youth, parents and child care workers); development of sun-protection products and of alternatives to ozone-depleting substances; increasing shade in playgrounds and other public places; and discouraging the use of tanning salons. Patient education materials can be obtained through the Canadian Dermatology Association, Suite 521, 774 Echo Dr., Ottawa ON K1S 5N8; tel 613 730-6262.

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References